

## **REMARKS**

### **Disposition of the Claims:**

This response is intended to be a full and complete response to the non-final Office Action mailed April 30, 2008. Claim 17 has been amended to correct the deficiency pointed out by the Examiner (changing "a both" to "both a") and to also incorporate the content of Claim 19. Claim 18 has been amended to correct the typographical error with regard to the word polyimides.

The Examiner is thanked for the indication that Claims 20 to 23 and 26 to 29 would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. In view of the Examiner's suggestion, Applicants have cancelled Claim 20 and rewritten this claim in independent form as newly added Claim 33 which also incorporates the content of Claim 17. In view of this amendment, Claims 21 and 22 have also been amended to correct dependency. In addition, Applicants have cancelled Claim 26 and rewritten this claim in independent form as newly added Claim 34 which also incorporates the content of Claim 24. In view of this amendment, Claims 27 and 28 have been amended to correct dependency. Applicants respectfully request entry of the above noted amendments and allowance of Claims 21, 22, 23, 27, 28, 29, as amended, and newly added Claims 33 and 34.

Claims 17 to 18, 21 to 25, 27 to 32, as amended, and newly added Claims 33 and 34 are pending in the present application. Applicants respectfully request continued examination of the present application and allowance of the pending claims.

### **Drawings**

The Examiner has objected to the drawings under 37 CFR 1.84(u)(1) and (2) because the view numbers are not larger than the numbers used as reference characters and because they are not preceded by the abbreviation "FIG.". Applicants herewith submit new drawings in which Applicant has sought to correct the

deficiencies noted by the Examiner. Applicants respectfully request that these new drawings be accepted by the Examiner and entered.

#### **First 35 U.S.C. § 102 Rejection**

The Examiner rejected Claims 17 and 18 under 35 U.S.C. § 102(a) as being anticipated by Pinnau, et al, U.S. Patent No. 5,670,051 (hereinafter "Pinnau"). This rejection is respectfully traversed with regard to Claims 17 and 18, as amended.

As noted above, Claim 17 has been amended to incorporate the content of Claim 19 which was not rejected under 35 U.S.C. § 102(a) as being anticipated by Pinnau. Accordingly, Applicants maintain that newly amended Claim 17 is also not anticipated by Pinnau. Amended Claim 18 depends from amended Claim 17 and therefore is also not anticipated by Pinnau. Applicants respectfully request that the rejection of Claims 17 and 18, as amended, be withdrawn in view of the noted amendment to Claim 17.

#### **Second 35 U.S.C. § 102 Rejection**

The Examiner rejected Claims 17 and 18 under 35 U.S.C. § 102(a) as being anticipated by Friesen, et al, U.S. Patent No. 5,611,842 (hereinafter "Friesen '842"). This rejection is respectfully traversed with regard to Claims 17 and 18, as amended.

As noted above, Claim 17 has been amended to incorporate the content of Claim 19 which was not rejected under 35 U.S.C. § 102(a) as being anticipated by Friesen '842. Accordingly, Applicants maintain that newly amended Claim 17 is also not anticipated by Friesen '842. Amended Claim 18 depends from amended Claim 17 and therefore is also not anticipated by Friesen '842. Applicants respectfully request that the rejection of Claims 17 and 18, as amended, be withdrawn in view of the noted amendment to Claim 17.

### **First 35 U.S.C. § 103 Rejection**

The Examiner rejected Claims 17 and 18 under 35 U.S.C. § 103(a) as being unpatentable over Baker, et al, U.S. Patent No. 6,271,319 (hereinafter "Baker") in view of Friesen, et al, U.S. Patent No. 5,753,008 (hereinafter "Friesen '008"). This rejection is respectfully traversed with regard to Claims 17 and 18, as amended.

Claims 17 and 18, as amended, are not obvious when considered in view of Baker in combination with Friesen '008 since the combination of the two references fails to lead one skilled in the art to a method for polymerizing polypropylene utilizing an ethylene sweeping gas to improve the recovery of propylene.

The Examiner noted that Baker does not disclose decreasing the propylene concentration of the permeate in the first membrane with a first sweeping gas but that Friesen '008 discloses a similar method comprising using a sweep gas on the permeate side of the membrane. The Examiner further noted that it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the sweep gas of Friesen '008 into the method of Baker to increase the driving force across the membrane and the flux of propylene through the membrane.

Claim 17, as amended, is directed to a method used to separate propylene from propane within a gas mixture during the polymerization of polypropylene. The method comprises bringing the gas mixture of propane and propylene into contact with a first membrane. From this contact, through selective permeation of propylene with respect to propane, a propylene-enriched permeate and a propane-enriched retentate is obtained. The propylene concentration of the permeate in said first membrane is decreased by utilizing a first sweeping gas that comprises ethylene. As noted beginning on page 4, line 37, to page 5, line 9, "[a]ccording to the essential characteristic of the invention, the propylene concentration of the permeate in the membrane is decreased by contacting a sweeping gas with the low pressure side of the membrane (permeate side)....The sweeping gas serves to increase the propylene partial pressure gradient on either side of the membrane and accordingly improves the productivity of the membrane. The sweeping gas does not contain any propylene and is preferably ethylene."

Baker teaches a process for polypropylene manufacturing using a gas separation membrane to separate propylene from propane in the reactor vent stream. Baker does not utilize a sweeping gas to improve the productivity of the membrane.

Friesen '008, the secondary reference relied upon by the Examiner, is directed to a method for separating mixtures of vapors. While Friesen '008 does indicate that "sweep streams" may be utilized in the method of Friesen '008 (see column 1, lines 56 to column 2, line 5 for a discussion of the countercurrent sweep method), nowhere is Friesen '008 is there any indication that an ethylene gas utilized in a process for polymerizing polypropylene would result in an improved recovery of propylene in the permeate-enriched stream as shown in the present invention. In fact, Friesen '008 does not discuss the polymerization of polypropylene or the use of an ethylene sweeping gas. The only sweeping gases that Friesen '008 discuss are air, argon, nitrogen, methane, steam, ethanol or other alcohols, propane or other hydrocarbons, acetone or other ketones, or virtually any other compound commonly encountered as a feed stream component.

Applicants maintain that one skilled in the art, considering Baker and Friesen '008 would not have been led to modify the method of Baker to include the use of a sweep gas that comprised ethylene in order to improve the productivity of propylene by the membrane. In view of the above, Applicants respectfully maintain that Claims 17 and 18, as amended, are not rendered obvious by Baker in view of Friesen '008. Accordingly, Applicants respectfully request that the rejection of Claims 17 and 18, as amended, under 35 U.S.C. § 103(a) as being unpatentable over Baker in view of Friesen '008 be withdrawn.

### **Second 35 U.S.C. § 103 Rejection**

The Examiner rejected Claims 24, 25, 30 and 32 under 35 U.S.C. § 103(a) as being unpatentable over Baker in view of Friesen '008. This rejection is respectfully traversed with regard to Claims 24, 25, 30 and 32.

The Examiner indicated that it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the sweep gas of Friesen

'008 into the method of Baker to increase the driving force across the membrane and the flux of propylene through the membrane. Furthermore, the Examiner indicated that one of ordinary skill in the art at the time the invention was made would have recognized that a separate effluent separation stage could be provided for each individual polymerization reactor to allow the production of polypropylene to continue while one effluent separator is out of service for maintenance.

Applicants maintain that Claims 24, 25, 30 and 32 are not rendered obvious by Baker in view of Friesen '008 for the same reasons noted above with regard to the rejection of Claims 17 and 18, as amended, in view of the same references. Accordingly, Applicants respectfully request that the rejection of Claims 24, 25, 30 and 32 under 35 U.S.C. § 103(a) as being unpatentable over Baker in view of Friesen '008 be withdrawn.

### **Third 35 U.S.C. § 103 Rejection**

The Examiner rejected Claims 19 and 31 under 35 U.S.C. § 103(a) as being unpatentable over Baker and Friesen '008, and further in view of Rao, et al, U.S. Patent No. 5,507,856 (hereinafter "Rao"). As noted above, Claim 19 has been cancelled and the content incorporated into Claim 17. Accordingly, the present rejection is respectfully traversed with regard to Claim 17, as amended, and Claim 31.

Baker and Friesen '008 are discussed in detail above. As noted with regard to these references, one skilled in the art, considering Baker and Friesen '008 would not have been led to modify the method of Baker to include the use of a sweep gas that comprised ethylene in order to improve the productivity of propylene by the membrane. The Examiner has relied upon Rao for disclosing a sweep gas that is ethylene. The Examiner notes that the sweep gas is used in a similar method. However, Applicants maintain that Rao does not teach a method for the polymerization of polypropylene. In addition, in column 2, lines 24 to 28, Rao note that "the key feature of the invention is passing a sweep gas across the permeate side of the membrane and withdrawing from the separator a sweep gas/permeate

effluent stream, wherein the sweep gas comprises one or more of the same hydrocarbons present in the feed mixture." While Rao does state that the sweep gas can be ethylene, Rao goes on to provide that "the one or more hydrocarbons in the feed mixture include methane, ethane, ethylene, propane, propylene, butane, isobutene, butylene, isobutylene, and mixtures thereof; the sweep gas comprises one or more of these hydrocarbons." The listing included in Rao treats the gases as equal. This is directly contrary to the present invention where it is noted that the sweeping gas does not contain propylene.

In view of the above, Applicants maintain that one skilled in the art, considering Baker in view of Friesen '008 and Rao would not have been led to modify the method of Baker to include the use of a sweep gas that comprised ethylene in order to improve the productivity of propylene by the membrane. In view of the above, Applicants respectfully maintain that Claims 17, as amended, and 31 are not rendered obvious by Baker in view of Friesen '008 and Rao. Accordingly, Applicants respectfully request that the rejection of Claims 17, as amended, and 31 under 35 U.S.C. § 103(a) as being unpatentable over Baker in view of Friesen '008 and Rao be withdrawn.

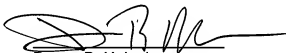
## CONCLUSION

Accordingly, in view of the above, Applicants believe that Claims 17 to 18, 21 to 25, 27 to 32, as amended, and newly added Claims 33 and 34 are patentable over the prior art cited by the Examiner. Applicants therefore believe that the present application now stands in condition for allowance. Early notice to this effect is earnestly solicited. Should the Examiner believe that a telephone call would expedite the prosecution of the present application, the Examiner is invited to call the undersigned attorney at the number listed below.

The Commissioner is authorized to charge \$120.00 for a one month extension of time fee and any other fees associated with this filing or credit any overpayment to deposit account number 01-1375.

Respectfully submitted,

Date: **September 2, 2008**

  
Donna B. Holguin  
Registration No. 38,082

Air Liquide  
2700 Post Oak Blvd., 18<sup>th</sup> Floor  
Houston, Texas 77056  
Phone: 713-624-8997  
Fax: 713-624-8950